Surface Mount TRANSZORB® Transient Voltage Suppressors

eSMP® Series

Top View Bottom View

MicroSMP (DO-219AD)

FEATURES

- Very low profile - typical height of 0.65 mm
- Ideal for automated placement
- Oxide planar chip junction
- Uni-directional polarity only
- Peak pulse power: 150 W (10/1000 µs)
- ESD capability: **15 kV (air), 8 kV (contact)**
- Meets MSL level 1, per J-STD-020C, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

DESIGN SUPPORT TOOLS

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3D Models Available

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for protecting sensitive equipment against transient overvoltages.

PRIMARY CHARACTERISTICS	
V_{BR}	6.67 V to 24.5 V
V_{WM}	6.0 V to 20 V
P_{PPM} (10 x 1000 µs)	150 W
T_J max.	150 °C
Polarity	Uni-directional
Package	MicroSMP (DO-219AD)

MECHANICAL DATA

Case: MicroSMP (DO-219AD)
Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 2 whisker test

Polarity: color band denotes the cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)				
PARAMETER		**SYMBOL**	**VALUE**	**UNIT**
Peak power dissipation with a 10/1000 µs waveform (fig. 1)		P_{PPM} (1)(2)	150	W
Peak pulse current with a 10/1000 µs waveform		I_{PPM} (1)	See next table	A
Power dissipation	T_M = 120 °C	P_D (2)	1.0	W
Power dissipation	T_A = 25 °C	P_D (3)	0.5	
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +150	°C

Notes

(1) Non-repetitive current pulse, per fig. 1
(2) Mounted on 6.0 mm x 6.0 mm copper pads to each terminal
(3) Mounted on minimum recommended pad layout

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE V_{BR} AT I_T (1) (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE CURRENT I_R AT V_{WM} (µA)	MAXIMUM V_C AT I_{PPM}		R_D	MAXIMUM V_C AT I_{PPM}		R_D
							10/1000 µs			8/20 µs		
		MIN.	MAX.				V_C (V)	I_{PPM} (A)	R_D (Ω)	V_C (V)	I_{PPM} (A)	R_D (Ω)
MSMP6.0A	AG	6.67	7.37	10	6.0	200	10.3	14.6	0.201	13.7	73.0	0.087
MSMP6.5A	AK	7.22	7.98	10	6.5	100	11.2	13.4	0.240	14.5	69.0	0.095
MSMP7.0A	AM	7.78	8.60	10	7.0	50	12.0	12.5	0.272	15.7	63.7	0.111
MSMP7.5A	AP	8.33	9.21	1.0	7.5	50	12.9	11.6	0.317	17.0	58.8	0.132
MSMP8.0A	AR	8.89	9.83	1.0	8.0	20	13.6	11.0	0.342	18.2	54.9	0.152
MSMP8.5A	AT	9.44	10.4	1.0	8.5	2.0	14.4	10.4	0.384	19.5	51.3	0.177
MSMP9.0A	AV	10.0	11.1	1.0	9.0	2.0	15.4	9.7	0.441	20.6	48.6	0.195
MSMP10A	AX	11.1	12.3	1.0	10	1.0	17.0	8.8	0.533	21.7	46.1	0.204
MSMP11A	AZ	12.2	13.5	1.0	11	1.0	18.2	8.2	0.570	24.4	41.0	0.266
MSMP12A	BE	13.3	14.7	1.0	12	1.0	19.9	7.5	0.690	25.3	39.5	0.268
MSMP13A	BG	14.4	15.9	1.0	13	1.0	21.5	7.0	0.803	27.2	36.8	0.307
MSMP14A	BK	15.6	17.2	1.0	14	1.0	23.2	6.5	0.928	29.5	33.9	0.364
MSMP15A	BM	16.7	18.5	1.0	15	1.0	24.4	6.2	0.960	32.5	30.8	0.455
MSMP16A	BP	17.8	19.7	1.0	16	1.0	26.0	5.8	1.092	34.7	28.8	0.520
MSMP17A	BR	18.9	20.9	1.0	17	1.0	27.6	5.4	1.233	36.8	27.2	0.586
MSMP18A	BT	20.0	22.1	1.0	18	1.0	29.2	5.1	1.382	39.3	25.4	0.676
MSMP20A	BV	22.2	24.5	1.0	20	1.0	32.4	4.6	1.706	42.8	23.4	0.783

Notes

(1) Pulse test: $t_p \leq 50$ ms

(2) Surge current waveform per Fig. 1 and derate per Fig. 3

(3) To calculate maximum clamping voltage at surge current uses the following formula: $V_{CL\ max.} = R_D \times I_{PP} + V_{BR\ max.}$

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)	250	°C/W
	$R_{\theta JM}$ (2)	30	

Notes

(1) Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient

(2) Units mounted on PCB with 6.0 mm x 6.0 mm copper pad areas; $R_{\theta JM}$ - junction to mount

IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS (T_A = 25 °C unless otherwise noted)

STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	C = 100 pF, R = 1.5 kΩ	V_C	H3B	> 8 kV
IEC 61000-4-2 (2)	Human body model (air discharge mode) (1)	C = 150 pF, R = 330 Ω		4	> 15 kV

Notes

(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance > 30 kV

(2) System ESD standard

ORDERING INFORMATION (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
MSMP6.0A-M3/89A	0.006	89A	4500	7" diameter plastic tape and reel

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

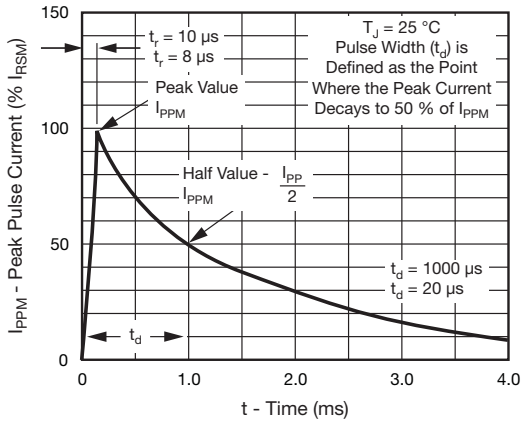


Fig. 1 - Pulse Waveform

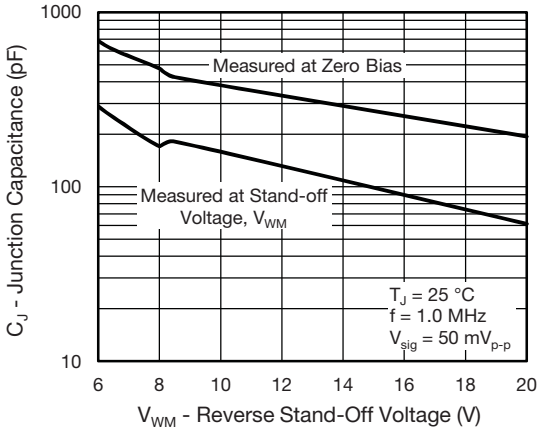


Fig. 4 - Typical Junction Capacitance

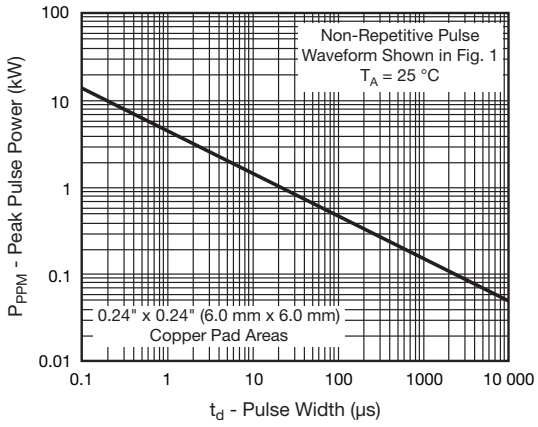


Fig. 2 - Peak Pulse Power Rating Curve

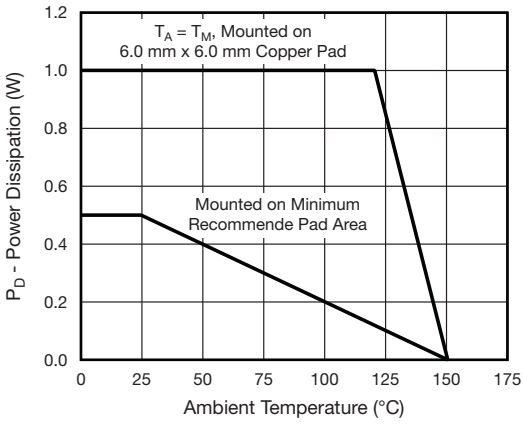


Fig. 5 - Power Dissipation Derating Curve

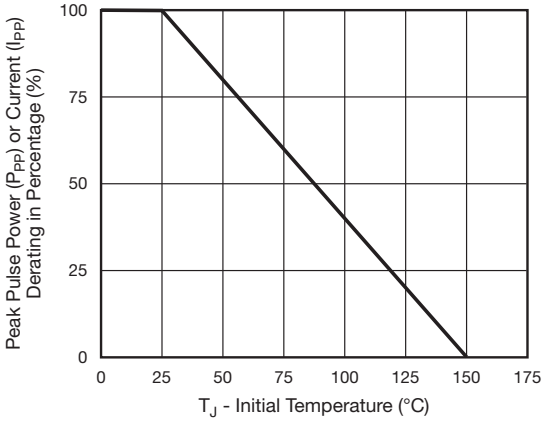


Fig. 3 - Pulse Power or Current vs. Initial Junction Temperature

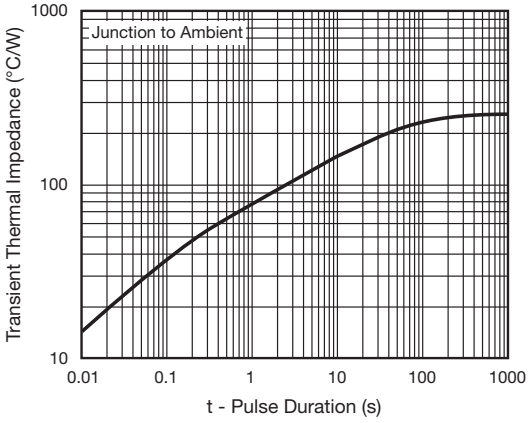
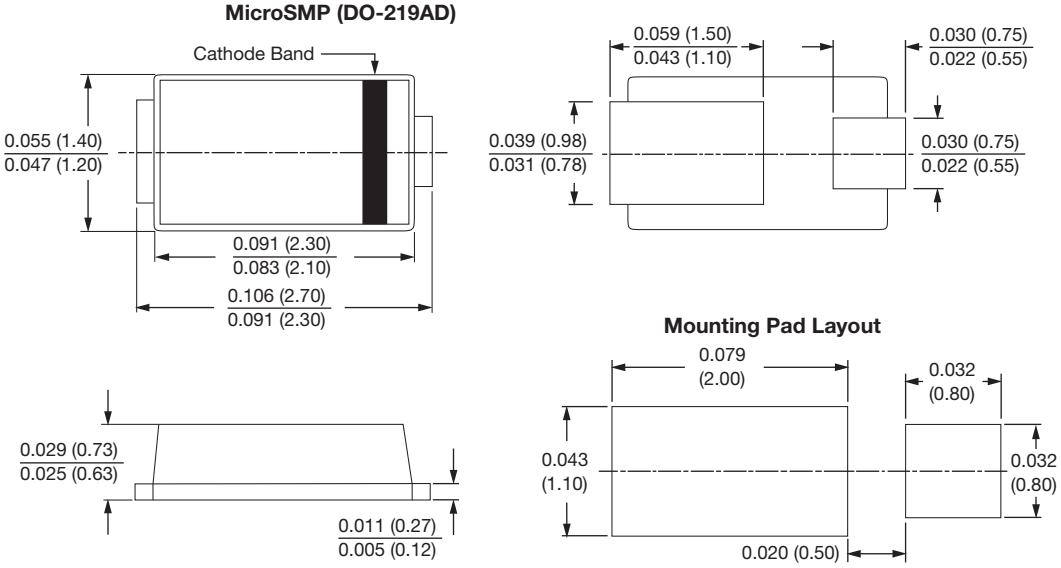


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

MicroSMP (DO-219AD)



Mounting Pad Layout

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